# COHA's Annual Research Webinar

# *Agenda*

DATE: **Wednesday, February 22, 2023**

TIME: **11:00 to 15:30 EST**

## 11:15 – 11:35 Cut nutrient inputs with sub-irrigation

### Optimizing nutrient delivery in greenhouse-grown potted chrysanthemums: Sub-irrigation and drip-irrigation systems

Dr. Barry Shelp – University of Guelph

Growers are often looking for ways to improve nutrient delivery – to be more efficient with nutrient input without affecting plant growth or quality. This project optimized the delivery of both macro- and micronutrients to sub-irrigated and drip-irrigated potted chrysanthemums. Research demonstrated that the entire nutrient supply can be removed during flowering, without affecting plant and flower yield and quality at harvest. Subsequent, it was shown that the supply of individual nutrients during vegetative growth can be reduced by 75% or more based on industry standards using subirrigation without any negative effect. From this information, an optimized fertilizer regimen was designed and tested successfully with both sub-irrigation and drip-irrigation systems. This project improves timing and reduces fertilizer supply, reduces volume of nutrient-rich feedwater for treatment or discharge, and reduces environment risk, contributing to low-input floricultural operations. It is believed that this strategy can be applied to other greenhouse crops.

## 11:35 – 11:40 Q&A with Dr. Barry Help

## 11:40 – 12:00 Save on fertilizer and get less thrips!

### Changing production practices to increase plant health and production efficiency in floriculture crops

Dr. Rose Buitenhuis – Vineland Research and Innovation Centre

Pests, such as thrips, are a major problem for floriculture crops. Thrips are attracted to and perform better on plants that are high in organic nitrogen – one of the main ingredients in standard fertilizer. This project is looking at ways to reduce fertilizer use and make floriculture crops less susceptible to thrips infestations while avoiding impacts on plant growth. Research conducted so far confirmed that reduced fertilizer use can indeed lead to less thrips, but this effect is overshadowed by the effect of chrysanthemum variety. Also, a few biostimulant products were tested, but these could not compensate for reduced fertilizer use.

## 12:00 – 12:05 Q&A with Dr. Rose Buitenhuis

## 12:05 – 12:25 Giving Canadian sod growers a competitive advantage!

### Integrating a genetic, agronomic, and economic approach to improving environmental adaptability and end use quality of creeping red fescue

Dr. Nityananda Khanal – Agriculture and Agri-Food Canada & Alberta Agriculture and Forestry

Creeping red fescue is a major export commodity for Canada. Currently, our seed production is lower than our main competitors. Research is focused on improving the global competitiveness of Canadian growers. This project is looking at ways for breeding creeping red fescue to become more resistant to disease and easily adaptable to different environments, how to improve seed productivity and quality, as well as the economics of changing the way we manage seed crops. One cycle of breeding selection has led to polycross seeds being used for a new cycle of selection.

## 12:25 – 12:30 Q&A with Dr. Nityananda Khanal

## 12:30 – 12:50 Does the temperature within a plant affect its growth?

### Temperatures within horticultural plants: Stems and Flowers – explaining rapid growth

Dr. Peter Kevan & Charlotte Coates – University of Guelph

The role of climate and weather is well-understood for growth and productivity of horticultural crops, both outdoors and indoors. Thermal conditions that develop within plants (microthermal regimes) are poorly researched and understood. This project is reviewing and exploring temperature regimes within plants and looking at how they might be manipulated to enhance commercial value and decrease risks, like disease and pests. Research conducted so far show the micro-greenhouse effects are much more widespread and biodiverse that previously realized. They are generated by plant pubescence and enclosed spaces (hollow buds, flowers, fruits, stems, galls etc.) and are mostly several degrees warmer than surrounding ambient air in sunny conditions. The effects do not apply at night or under cloudy conditions. The microgreenhouse effects have been explained through heliocaminiform structure and function. Special consideration is given to our general review and concepts. The extent of the effects in flowers and stems of several floricultural species (Gerbera, Amaryllus, Narcissus, squash), fruits (ground cherry, black cumin, peppers, prickly cucumber, milkweed), and other hollow, translucent plant structures. The heliocaminiform effects have probable important implications for understanding how heat units (growing degree days) should be re-assessed, especially with climate change (temperature and sunshine).

## 12:50 – 12:55 Q&A with Dr. Peter Kevan and Charlotte Coates

## 12:55 – 13:10 BREAK

## 13:10 – 13:30 New flower varieties thrive with less water and less fertilization

### Integrated techniques for efficient breeding, production, and transplant survival of unique ornamental species

Dr. Praveen Saxena & Alan Sullivan – University of Guelph

The ornamental horticulture sector needs to reduce its municipal water consumption and limit the use of fertilizers that cause pollution. It also needs to quickly produce cultivars for rapid commercialization and keep plants alive and healthy during this process. Research is focused on improving breeding, production, and transplantation. This project is looking to breed new varieties that are adapted to nutrient poor environments. It is also using micropropagation for low-cost rapid production and cryopreservation for disease-free transplantation. Research conducted so far has successfully produced a new breed that survives well with low water and low nutrients. Also, it has enhanced the way we use cryopreservation by adding melatonin and serotonin for better growth after clod stresses. A tissue culture protocol for rapid release is underway.

## 13:30 – 13:35 Q&A with Dr. Alan Sullivan and Dr. Praveen Saxena

## 13:35 – 13:55 Improving irrigation pond water quality for reuse

### Minimizing horticultural impacts on surface water quality to encourage re-use through enhanced pond management

Dr. Jeanine West – Phytoserv

Recycling irrigation water can lead to poor water quality and excessive biological growth in ponds. This means expensive maintenance costs to repair clogged intake filters for irrigation. Research was geared towards better management of irrigation ponds. This project evaluated in-pond technologies as well as pre-pond treatments to improve water quality. Research conducted so far has shown that preventing nutrients from reaching the pond is the most important practice, with a woodchip and slag hybrid treatment swale showing promise for preventing nutrient runoff. Where pond quality is compromised,

covering ponds is successful at decreasing levels of phytoplankton while aeration is effective for breaking down organic matter.

## 13:55 – 14:00 Q&A with Dr. Jeanine West

## 14:00 – 14:20 Less water and high-quality plants with precision irrigation

### Irrigation efficiency in nurseries: towards a more sustainable approach

Dr. Charles Goulet – Université Laval

Irrigation is one of the most important factors for nursery profitability. Yet, 3 out of 4 growers base their decision making on visual appearance or pot weight. This project is looking to optimize irrigation management using wireless tensiometers combined with different automation strategies to develop recommendations and best practices for clustering plants in nurseries. Research conducted so far has shown 50% less water used with tensiometers with no effect on plant growth, confirming that automated irrigation can be used to produce high quality plants. Also, clustering plants based on overall water needs may not be the best way since they may not require the same amount of water at the same time during a season.

## 14:20 – 14:25 Q&A with Dr. Charles Goulet

## 14:25 – 14:45 LEDs are more efficient and long-lasting than conventional lighting

### Use of LEDs to improve ornamental crop production

Dr. Youbin Zheng – University of Guelph

Light-Emitting Diodes (LEDs) have gained wide acceptance in cut flower, greenhouse vegetable, and indoor leafy green production. There is still much to learn on how best to use LED technologies for indoor plant propagation. Research is focused on validating the replacing of HPS conventional lighting with LED technology. This project is looking at how light conditions affect seed germination, how different light qualities impact stock plants, and how effective pre-finishing LED treatments are for making plants more robust for shipping. Research conducted so far has found that LEDs are more efficient than HPS. They last 2 – 4 times longer and allow for narrower fixture designs that cast less shadow. Also, LED allows for more complex lighting functionalities to be used.

## 14:45 – 14:50 Q&A with Dr. Youbin Zheng

## 14:50 – 15:10 Helping sod growers reduce fertilizer use and impacts on water

### Optimizing turfgrass fertilization to reduce nitrate losses through leaching

Dr. Guillaume Grégoire – Université Laval

Leaching of fertilizer nutrients into nearby water bodies is a great concern for sod growers and turf managers. This project is looking at ways to improve fertilizer efficiency for turfgrass to reduce nitrate losses through leaching. Research conducted so far has shown that it is possible to maintain high quality turfgrass while reducing risks to water bodies with minimal nitrate leaching. New protocols led to nitrate levels well below the Canadian standard for drinkable water.

## 15:10 – 15:15 Q&A with Dr. Guillaume Grégoire

## 15:15 – 15:30 CLOSING REMARKS

For more details on these research projects, click here to access COHA's Research Cluster 3 webpage.